BERMUDA
1721D

ANNUAL REPORT

OF THE

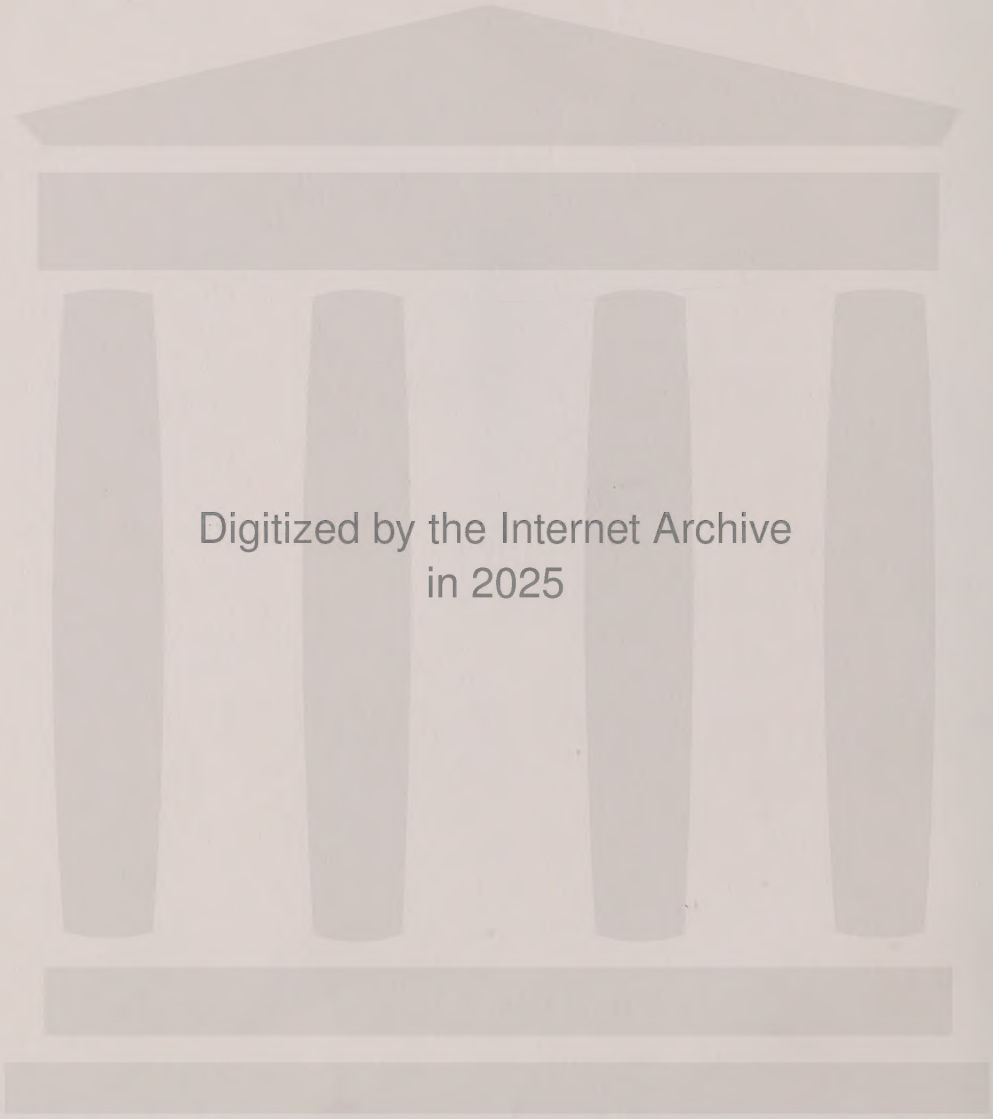
DIRECTOR OF AGRICULTURE

FOR THE YEAR

1959

PRINTED BY THE BERMUDA PRESS, LTD.

24 NOV 1960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Board of Agriculture 1959

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DEPARTMENT OF AGRICULTURE

Gordon R. Groves	Director of Agriculture
I. W. Hughes, M.Sc. (Agric.)	Assistant Director of Agriculture
E. R. Earl, B. V. Sc.	to 30th June, 1959, Government Veterinary Officer
J. W. Sutherland, B. V. Sc.	Acting Government Veterinary Officer from 1st July, 1959.
A. G. Dustan, M.Sc.	Entomologist (part time)
E. A. Manuel, B.S.A.	Plant Pathologist
J. H. Jones	Horticulturist
C. V. S. Early	Agricultural Officer
T. A. Hollis	Agricultural Officer
F. C. Hollis	Agricultural Officer
D. J. Moore	Reafforestation Officer
J. E. King	Reafforestation Superintendent
L. E. Tapsell	Reafforestation Superintendent
E. E. Sheppard	Marketing Officer
R. M. Shastri	Assistant Marketing Officer
Mrs. H. Bulle	Clerk
Mrs. I. Kellaway	Accountants Clerk
Mrs. A. Simons	Exhibition Secretary (part time)

Other employees including foremen, mechanics, gardeners and reafforestation workers: 100.

REPORT

OF

The Director of Agriculture, 1959

The Chairman, Board of Agriculture:

I have the honour to submit a report of the Department of Agriculture for the year 1959.

I. AGRICULTURE IN 1959

For the third year in succession a high rainfall was the most outstanding feature of the weather during the year 1959. Records kept at the Botanical Gardens reveal a rainfall for the year of 80.74 inches. The highest monthly precipitations were 11.55 inches in August, 9.39 inches and 9.31 inches in December and June respectively. Fortunately the hurricane season passed without any serious gale force winds and the winter months were relatively calm.

Vegetable Production:

The production of vegetables was considerably higher than in the previous year, with very heavy crops of potatoes and tomatoes. During the year under review produce to the value of £64,000 was purchased by the Government Marketing Centre compared with £49,000 in 1958.

Restrictions were placed on the importation of fresh vegetables when local supplies were adequate to fulfil requirements. These restrictions were enforced under the Importation of Fruit and Vegetable Act, 1958.

The demand for fresh Bermuda grown vegetables continues to be keen, despite the competition from the imported canned and frozen articles. However, the market was heavily glutted with tomatoes during June and July, in spite of the restriction on imports. This is mainly due to farmers planting too large an acreage of tomatoes to be harvested in these months.

Frequent reference in the past, has been made to the need to spread the planting of tomatoes over a longer period, but it appears to be difficult to persuade the farmers to adopt a change. Tomatoes naturally grow and crop better during the early summer months, hence the desire on the part of the grower to plant heavily for this period. The tomato crop is very liable to be destroyed by adverse weather conditions at other times of the year, which tends to make the growing of tomatoes a rather hazardous undertaking.

The Easter Lily Trade:

The export of Easter lily flowers dropped steeply during 1959, with the declared customs value totalling only £5,593 compared with £16,674 the previous year and £34,000 in 1957. Although a decline in the Easter lily trade was envisaged several years ago, due to a rapid deterioration of the plants through

virus diseases and the excessive cutting of the stems, it was not expected that the export of the flowers would drop from a value of £34,000 to under £6,000 in three years. In addition to the deterioration of the stock, other factors are involved. The cost of labour, as in all trades, has risen, considerably during the past decade. This high cost of labour coupled with the difficulty in obtaining suitable labour for horticultural work has caused growers to change their planting programme. One grower who used to plant between 13 and 15 acres of lilies annually now plants under 2 acres. In the place of lilies he is growing potatoes.

Although it may not be possible to revive the lily industry to its former status, there is a demand for both flowers and bulbs locally. Bermuda became well known overseas for the beauty of the Easter lily and over the years Lilium longiflorum var. Eximium has become an essential part of the Colony. It is for these reasons that the Department of Agriculture started a lily improvement scheme some three years ago. The original stock selected to implement the scheme, sufficient to plant 30 rods, has now risen to 198 rods. A limited number of bulbs were sold in 1959, and it is hoped that more bulbs will be available for sale in 1960. The stocks of the two Japanese varieties, Lilium longiflorum var. formosa (Erabu) and L. longiflorum var. giganteum (Takesima), both flower well. The bulbs were replanted for the 1960 season.

Citrus Culture:

Good crops of citrus were reported by most growers. An embargo was placed on the importation of grapefruit effective from the middle of December, 1959. It is estimated the grapefruit crop will last until the end of April, 1960.

Although some improvement is noted in the marketing of citrus fruit, through the Wholesale Marketing Centre, most of the growers prefer to market their own fruit through their favourite channels. The prices as approved by the Board of Agriculture and the Bermuda Citrus Growers' Association had the effect of stabilizing the prices of citrus fruit throughout the Islands.

The spraying programme carried out by the Department of Agriculture, while very effective in the control of scale insects in most orchards, did not adequately control rust mite and white fly. Some orchards were almost entirely free of rust mite, while others were heavily attacked.

Locally budded citrus trees are still in great demand, some 1,674 citrus trees were sold from the Department's Plant Nursery during 1959.

Dairying:

Despite the loss of land suitable for dairying farming, the production of milk was maintained at about the same level as the previous year, 1048 dairy cows producing 611,526 gallons of milk. The Department of Agriculture is, however, concerned with the over grazing of the limited land area. In some instances cases of severe soil erosion is taking place, particularly the areas adjacent to the dairy barns. This is a situation which must necessarily receive the immediate attention of the farmers. Soil washed into the sea can not be reclaimed. Efforts are, therefore, being made by the Department of Agriculture to show the dairy farmers how their limited pasture land may be fenced to facilitate rotational grazing, and thereby minimise the risk of soil erosion.

Poultry:

The production of eggs was again maintained at about the same level as for the last three years. Egg production amounted to 485,000 dozen.

Other Animal Production:

During 1959 the Government Veterinary Officer inspected in the slaughter houses 1,321 carcasses of pork, 184 of beef and 145 of veal. In addition 9 goats were slaughtered for meat.

Apiary culture showed a tendency to improve during the year under report. The Beekeepers' Association was revived. There is a ready sale for local honey.

Spraying Service:

The two spray trucks were in almost constant operation applying 215,140 gallons of spray to farm crops, citrus and ornamentals. Growers have come to rely more heavily than ever on this service offered by the Department of Agriculture. While there are certain difficulties involved in the successful operation of such a service — the problem of timing of sprays being the primary one — the control of plant pests and diseases has been generally good.

II. REAFFORESTATION SCHEME — PARKS DIVISION

During the year under review the Reafforestation Compulsory Powers Act, 1952, was amended which gave the Board of Agriculture power to fell dead trees on "any land within these Islands".

An amendment was needed, because the felling of dead cedar trees was virtually completed to a depth of 100 feet on either side of the roads. The amendment permitted the Department of Agriculture to remove the dead trees from any property. A limitation clause, however, was inserted in the amendment, which means the Act has to be renewed annually. The Board of Agriculture therefore, adopted the policy of removing trees from areas which are conspicuous from the public roads. Several such areas were selected in Smith's and Paget parishes.

Felling Dead Trees:

With the new powers to clear wider areas it will facilitate the felling of dead trees and large areas can now be worked more efficiently. During 1959 some 12,443 trees were felled. This figure included the felling of dead trees on the Memorial Park Golf Course and in Paget and Smith's parishes.

Planting:

Nearly 6,000 plants were used in the various planting schemes undertaken in 1959.

Maintenance of Roadside Planting and Hedges:

It is again a pleasure to record that relatively few cases of vandalism were reported. In the past, many trees and shrubs were wilfully destroyed by unknown persons. The only damage of note during the year, was along the Trimingham Road where 12 young palms were pulled up. This happened at a time when a number of Royal Canadian Naval ships were visiting Bermuda.

The maintenance of hedges throughout the Colony is a time absorbing occupation. Generally speaking the hedges were maintained in good condition.

Wayside Parks and Ornamental Planting:

The Trimingham Road Park was increased in size by the donation to the Government of another strip of land at the southern end of the road. The acquisition of this piece of land has vastly improved the southern approach to this roadside park. The planting of Easter lilies, petunias and vincas in this area were much admired throughout the year. A more permanent form of planting should, perhaps, be adopted for the round-abouts, but it must be admitted the beds of petunias and vincas gave a very fine display of colour.

The parks were maintained throughout the year by employees of the Department of Agriculture. Previously the work had been put out to contract. It is, however, difficult to adhere to a contract for this type of work, hence the decision to abandon the contract method. The mowing of the school playing fields was done by contract, Mr. Norman M. Moniz being the successful bidder. During 1959 the Department was responsible for the maintenance of 84 separate areas of Government land from St. George's to Somerset, maintained as parks and gardens, and 22 school playing fields and grounds with a total area of 197 acres.

Easter Lily Plantings:

Six areas of land in five parishes were planted with approximately 60,000 lily bulbs. These plots were visable from the public roads, or from the parks, so that the tourist could see some lily fields in full bloom.

III. ENTOMOLOGY, PLANT PATHOLOGY AND OTHER INVESTIGATIONS

Investigations on a wide range of problems were carried out during the year by the Entomologist, Plant Pathologist and the Acting Assistant Horticulturist. The following summary indicates the scope of these investigations.

Spittlebug — Clastoptera undulata Uhler

On July 27th an infestation of spittlebugs was recorded on casuarina trees in the Tucker's Town area. The insects were subsequently determined as **Clastoptera undulata** by authorities in the United States National Museum in Washington, D.C. This species is a fairly common pest of Casuarina spp. in certain islands in the West Indies and in Southern Florida, but was previously unrecorded in Bermuda.

The method by which this insect gained entrance to Bermuda is unknown, as is the exact date of introduction. It would appear, however, that the spittlebug became established initially in Tucker's Town probably in 1957 or 1958. By December of 1959 the insect had spread as far west as Warwick Parish and it is only a matter of time before its distribution is island-wide.

While **Clastoptera undulata** and related species of spittlebugs are not considered serious pests of **Casuarina** in the Caribbean it is impossible to say at this stage what effect this insect will have on **Casuarina** under Bermuda conditions. Until such time as evidence to the contrary is apparent the spittlebug must, therefore, be considered a dangerous threat to the extensive **Casuarina** plantings in the Colony.

To combat the spittlebug the following steps have been taken:

1. The Entomologist, Mr. Alan Dustan, has begun detailed studies on the life history and habits of **Clastoptera undulata** under local conditions. This basic research will be invaluable in guiding future control work directed against this pest. Work in this area has been somewhat complicated by the fact that the spittlebug will not survive under laboratory conditions. Field studies have yielded a great deal of information, however, and these studies will be continued throughout the coming year.

2. Chemical control investigations have been conducted by the Entomologist and by the Plant Pathologist with very satisfying results. Excellent control of nymphal and adult stages of the spittlebug was achieved with both malathion and dieldrin. The effect of these materials on the eggs of **Clastoptera** has yet to be evaluated. Dieldrin, with its longer residual action, is capable of killing newly-hatched nymphs for a period of a month or more. Extensive spraying of Casuarina trees in Tucker's Town with Malathion (2 pints 50% emulsifiable concentrate per 100 gallons of water) resulted in marked reduction of spittlebug numbers, indicating that large scale chemical control programmes are possible, if not altogether practical or economical.

3. The Commonwealth Institute of Biologlcal Control has been asked to undertake studies on the natural enemies of **Clastoptera undulata** with the view of introducing promising species into Bermuda. Already small shipments of an encyrtid parasite **Carabunia myersi** have been received from Puerto Rico and arrangements made for much larger shipments of this parasite in coming months. **Carabunia myersi** is very effective in holding Clastoptera spp. in check in the West Indies and will be given exchaustive trials in Bermuda. From a standpoint of efficiency and economy, biologlcal control offers the best means of curbing the spittlebug in the Colony and it is hoped that efforts in this line will prove successful during the coming year.

Mediterranean Fruit Fly — Ceratitis capitata Wied.

The campaign against the Mediterranean fruit fly was continued for the third successive year. The use of traps baited with an attractant, along with foliar and ground insecticidal sprays, have steadily reduced the amount of damage done by the fruit flies to citrus and peach crops.

Fruit fly activity remains at a low level throughout the winter months. Build-up of fly populations occur during, and shortly after, the ripening of the fruit of the Surinam cherries. Adult fruit flies emerging from Surinam cherries in June are forced to search for alternate host fruits and consequently turn to citrus, and later to ripening peaches.

Where several years ago large quantities of citrus fruits were ruined by fruit flies, no damage to citrus was reported in 1959.

There still remains a small concentration of fruit flies in Warwick Parish which, each summer, serves as the dispersal point for these pests. Whether more intensive trapping and extensive spraying can eliminate this source of fruit flies remains to be seen. If the fruit fly could be eradicated from Bermuda the growing of peaches could be carried on very successfully and would certainly be encouraged by this Department.

Juniper Scale — Carulaspis minima Targ.

An investigation was undertaken by the Entomoligist to secure information on the current position of the juniper scale — the insect primarily responsible for the death of the Bermuda cedars. Four classes of cedar trees were examined for the purpose of gathering data:

(1) cedar seedlings, (2) older trees which had recently thrown out new growth, (3) cedars which were evidently dying and (4) junipers of other species now growing in the Colony.

Virtually all trees examined were found still to be infested with scale. The heaviest concentrations of scale were found on trees which were evidently dying. Parasites and predators were found in only limited numbers and seemed to be exerting very little control on the scale. Junipers other than **juniperus bermudiana** were infested with scale but were not visibly injured by the attack.

It was the feeling of the Entomologist that the cedar scale is not increasing, or spreading as rapidly as it did eight or ten years ago. Loss of virility on the part of the scale or a build up in resistance on the part of the remaining cedars, or a combination of both factors, was advanced as a possible explanation for the slow down in scale development.

Storage of Grapefruit:

Citrus culture in Bermuda has now expanded to the point where existing marketing arrangements are no longer adequate to handle the locally produced fruit. The marketing of Bermuda grapefruit has been of particular concern since the market is usually flooded by growers anxious to get the best early season price for their produce. To overcome this problem fruit will have to be stored under refrigeration and released on the market in manageable quantity throughout the late winter and spring.

Experiments designed to determine the most satisfactory method of storing grapefruit were begun during the winter using carefully selected and graded Marsh Seedless fruit. Certain grapefruit were subjected to no treatment, to serve as a check, while the remainder were dipped in the fungicide Dowicide — A Hexamine or dipped and then waxed with a commercial product Florida Wax 101A. Samples of fruit receiving the different treatment were then stored under temperatures of 40°, 50° and 60°F. Three crates of untreated fruit were also stored under room conditions where the daily temperature averaged about 68°F. These tests demonstrated that:

1. Waxing of fruit greatly reduced shrinkage and improved its appearanc regardless of the temperature at which the fruit was held.

2. Dipping fruit in Dowicide - A Hexamine definitely checked the development of fungous diseases in storage.

3. The storage temperature of 60°F. proved superior to 40° and 50°F. Waxed fruit refrigerated at 60°F. remained perfectly firm for as long a period as three months and could very probably have been held much longer with no deterioration. Waxed fruit on being removed from storage at 60°F. after three months remained firm and attractive for an additional one month.

Biological Control Projects:

Both oleander scale, **Pseudaulacaspis pentagona** and green shield scale **Pulvinaria psidii** continued as pests of importance on local oleander plantings. Shipments of parasites and predators for release against these two scales were received at intervals throughout the year through the co-operation of the Commonwealth Institute of Biologocal Control. Beneficial species liberated for the first time in Bermuda included the coccinellids **Cryptolaemus affinus,** released against green shield scale, and **Chilocorus circumdata,** a predator of the oleander scale.

Two species of predacious snails were released in the Colony in an effort to reduce the numbers of the phytophagous snail **Otala lactea.** Three shipments of Euglandina rosea and one of **Gonaxis kibweziensis** were received from Hawaii during the fall. The former species of predacious snail was first introduced in 1958 and appears now to be established in several localities. **Gonaxis kibweziensis** was a new introduction.

Herbicides:

Experiments were conducted to determine whether weed growth along the highways in Bermuda could be successfully controlled by chemical means. Some of the problems encountered in this study included: application of material in a manner which would protect desirable plantings along roadsides, resistance of grasses — particularly Bermuda grass and nut grass — to herbicidal action; and failure of herbicides to give long term residual control of weeds.

Of the many materials tested a spray containing a combination of 2-4-D and sodium chlorate showed the most promise. This spray would have to be used with extreme caution, however, to avoid damage to ornamental plants along roadsides. The materials Dowpon, Kuron and Weedozal are worthy of further tests, with Weedozal probably being the least dangerous in terms of hazard to desirable plants.

Collection of Endemic Plants:

An excellent survey of the current position of Bermuda's Endemic flowering plants and ferns was carried out by the Acting Assistant Horticulturist, Mr. David Wingate. All of the species in these two groups of plants originally reported by Britton in 1918 were found during the course of this survey, although a number of species were obviously on the point of extinction. A collection of Endemics was subsequently displayed at the Agricultural Exhibition and material gathered for that display is now available for propagation purposes.

IV. HORTICULTURE

It is a pleasure to record a continued expansion of the horticultural activities. The Horticulturist and the Reafforestation Officer have been extremely active in their respective fields and much has been accomplished during the year under report. Despite this expansion there is a great deal more which can be done with careful thought and planning to improve general horticulture in Bermuda. Horticulture must necessarily play a far greater role in the work of the Department of Agriculture in the future. Careful consideration must be given to the full use of the more permanent planting material of bulbous plants, herbaceous plants, succulents and ornamental shrubs. The floras of the Mediterranean Region, Australia and New Zealand should be studied with a view to further introductions of desirable plant material. There is a great future for ornamental horticulture here and no effort should be spared to make Bermuda outstanding in its wealth of good gardens and good garden plants.

Botanical Gardens:

Several noteworthy changes were made in these gardens during 1959. With the erection of the new Rest Room facilities at the southern end of the Horticultural Hall it was necessary to re-make and enlarge the rock garden. Large well weathered stones were secured from the sea shore for the enlargement of the garden. Many additional species of Kalenchoe, Aloe and other succculents were added to the collection. The introduction of herbaceous material such as Savia farinacea, Gerbera varieties, Dianthus spp. and bulbous plants have added a great deal of variety and colour to the new rock garden.

The area in front of the offices was likewise re-designed to facilitate the free movement of traffic in the vicinity of the offices. This change made it possible to considerably enlarge the car park.

A start was made towards the end of the year on the garden for the Blind. This will be similar in design to gardens for sightless people found in some of the English City Parks.

Perhaps the greatest blow to the Department of Agriculture since the formation of the Public Gardens in 1898, now the Botanical Gardens, was the agreement which was made in 1959 to transfer one-seventh of the Botanical Gardens to the King Edward VII Memorial Hospital, for the expansion of the Hospital buildings. While no one can doubt the need for good hospital accommodation, it is a matter of great regret to the Board of Agriculture and particularly to the Director and his staff, that this section of the garden must be absorbed in the Hospital expansion scheme. During the past 10 years much time, thought and energy have been used to develop the Victory Orchard and the fine collection of Oleanders, which must now be moved to make way for the new hospital.

Montpelier Arboretum:

Good progress was made in the development of the Arboretum in Devonshire. Many new plantings were established throughout the year. Several of the old quarries on the property have been cleaned and planted with a variety of interesting plants. This arboretum is being designed to establish a fully representative collection of trees and shrubs which thrive in Bermuda. Pleasing views will be created and no vehicular traffic will be allowed to enter the arboretum. All walk ways will be grass. It is proposed to construct an adequate car park near a new entrance to be made on the Montpelier Road.

Tula Valley:

The new plant nursery at Tula Valley is developing along very satisfactory lines. A mist propagating unit has been installed. Some difficulties have been experienced with this unit, but it is hoped the troubles will be corrected.

Nursery Work, including Citrus Propagation:

During 1959, 33,135 plants were despatched from the plant nursery. Nearly 6,000 of these were used in the Parks' division, while the remainder were either sold to the general public or distributed for the special 350th Anniversary plantings.

The propagation of citrus trees continued to involve a great deal of labour and personal attention on the part of the Reafforestation Officer. Sales of budded citrus in 1959 amounted to 1,694 trees. These were sold at 10/- each.

Trial Plots:

A vegetable trial plot was maintained in the Botanical Gardens. The main purpose of this plot is to test new varieties. Samples of each consignment of seed potatoes were also planted to check the incidence of virus diseases.

Advisory Service:

The Horticulturist spent a great deal of his time in carrying out advisory visits. Many requests were received on a variety of gardening problems.

School Gardening:

The Horticulturist continued to give talks and advice to schools taking an active interest in gardening. However, unfortunately, the tendency to drop gardening from the school curriculum is increasing. This is a most unfortunate trend in a community where horticulture must play a far greater role in the life of the people than it does at present. It is, therefore, necessary to instil a love for plant life in the rising generation at an early age.

Arbor Societies:

The Arbor Societies of St. George's, Hamilton, Smith's, Warwick, Southampton and Sandys parishes continue to take an active interest in the horticultural affairs of their respective parishes. Special mention should be made here, of the very good work performed by the Hamilton Parish Arbor Society in establishing so many small, roadside quarry gardens. These quarry gardens are seen by all road users and have been the subject of many favourable comments. Assistance was given to the Societies by the Department of Agriculture in the form of funds, plants and labour.

V. ANIMAL HUSBANDRY

The Government Veterinary Officer, Dr. E. R. Earl, resigned on the 30th June, 1959. Dr. J. W. Sutherland acted as Government Veterinary Officer for the remainder of the year.

Control of Animal Diseases:

A severe outbreak of tuberculosis was diagnosed in one herd of dairy cattle at the beginning of the year when 6 animals were slaughtered. Subsequent tests revealed another 19 reactors resulting in a total of 25 heads of cattle reacting to the tuberculin test throughout the year. No other herd was affected. This outbreak of tuberculosis is rather startling particularly so, because no reactor to the test was found during the two previous years, in any herd.

Some 93 calves were vaccinated with Brucella Arbortus vaccine strain 19 to control Bangs disease, and 350 pigs were vaccinated with anti hog cholera.

Improvement of Livestock:

No farmer applied to the Board of Agriculture for assistance to import a pedigree bull during 1959. A number of dairy cows were imported from the U.S A. and Canada by individual farmers as replacements.

The Director of Agriculture personally investigated a method of raising grass in incubators, a system which is being used in some parts of the U.S.A. It was thought that with the declining grassland acreage in Bermuda an artificial method of raising good quality grass in quantity might prove beneficial. Although this system is highly recommended by the manufacturers who claim that cattle fed on this incubator grown grass give increased milk yields, the animal nutrition research workers are very sceptical about this claim. This taken into consideration with the high initial cost of the incubator, it was decided that the introduction of the system to Bermuda should be held in abeyance for the time being.

VI. WHOLESALE MARKETING CENTRE

Produce to the value of £64,000 was purchased by the Wholesale Marketing Centre which was £15,000 higher than the previous year. The potato crop of 30,257 bushels, showed an increase of 10,045 bushels compared with the previous year.

The following table shows the value of the purchases made during the last five years:

1955	£47,326
1956	£59,630
1957	£47,000
1958	£49,000
1959	£64,000

The very heavy crop of potatoes caused an acute storage problem. Potatoes can only be stored satisfactorily in Bermuda through the summer months in a temperature of 40°F. due to the presence of the potato tuber moth. At a temperature of 40°F. the tuber moth remains inactive and no damage is done to the potatoes. Due to shortage of chill room space, some 8,000 bushels of potatoes were stored in an old ammunition store at Ireland Island. Unfortunately, the temperature in this building although a few degrees lower than the outdoor temperature, was far too high. The tuber moth became active resulting in the complete loss of the potatoes stored in the building. This represents a substantial loss on the year's operation of the Wholesale Marketing Centre. To overcome losses of this nature, in the future, adequate chillroom space must be provided, either by the erection of additional chillroom facilities by the Government, or the hiring of commercial chillroom storage.

It is with regret that the Department's Wholesale Marketing Centre in Front Street, Hamilton, formerly known as the Farmers' Market, virtually closed its doors for the last time on the 31st December, 1959. The Corporation of Hamilton found it necessary to use this building in connection with the further expansion of the Hamilton dock facilities. It was, therefore, necessary for the Department of Agriculture to establish the market in the Cold Storage Plant at Prospect. While this new Centre is suitable, it is thought to be too far away from the main business centre. However, there was no other site available, so for the time being the Wholesale Marketing of vegetables must be operated from the Prospect site.

VII. AGRICULTURAL EXHIBITION

The twenty-fourth Agricultural Exhibition was held on the 16th, 17th and 18th April, 1959. Special features were included to commemorate the 350th Anniversary year. The weather was fine throughout the Exhibition, resulting in an average attendance, which is shown in the following table:

Year	Exhibitors	Entries	Paid Admission
1955	305	2000	9,957
1956	385	2450	14,400
1957	391	2486	10,500
1958	454	2585	7 800
1959	436	3061	10,255

Annual Citrus and Poultry Show:

The Annual Citrus Exhibition and Poultry Show was held at the Botanical Gardens under the auspices of the Citrus Growers Association and the Poultry Fanciers Society in the month of January.

VIII. EXTENSION WORK

Publications:

The monthly Agricultural Bulletin continued to serve a very useful purpose. This bulletin was revived in 1955 with a monthly circulation of 250 copies. At the close of the year under review the circulation had risen to 700 copies per month. Other Departmental Publications include:

"The Green Shield Scale, Pulvinaria Psidii Mask. (Coccidae) in Bermuda".
by F. J. Simmonds.

"Report on a Recent Study of the Cedar Scale".
by A. G. Dustan.

"Land Crabs and Their Control," Revised.
by A. G. Dustan.

"The Biological Control of Insect Pests in Bermuda".
by F. D. Bennett and I. W. Hughes.

(was published in the Bulletin of Entomological Research, Vol. 50, Part 3, November, 1959.)

Lectures and Demonstrations:

Lectures were given by members of the Staff to the Arbor Societies, The Garden Club and other organizations on agricultural and horticultural topics.

Advantage was again taken of the time made available by the Bermuda Broadcasting Company, Ltd., every second Wednesday of the month. Members of the Staff of the Department discussed a variety of topics in these talks.

IX. LAND CONSERVATION

This report would not be complete unless some reference be made to the efforts of the Board and Department of Agriculture to conserve arable land and open spaces. Many meetings of the Board were held during 1958 and 1959 to draft a scheme for the conservation of arable land. Unfortunately this scheme did not find favour in the House of Assembly, whereupon a Select Committee of the House of Assembly was appointed to reconsider the whole subject. The report of the Select Committee is anxiously awaited. However, the Board was more successful in their recommendation to purchase land adjoining Spittal Pond. During the year 1959, 16.812 acres of land were purchased by the Government from three separate owners, in this area. The purchase of land by the Government appears to be the only way in which open spaces may be preserved from the ever increasing building boom.

X. FINANCIAL

From the financial statement Appendix "B" compiled from records kept at the Department of Agriculture, it will be observed that the total allocation of funds for 1959 was £208,178 of which £193,078 was spent. Departmental receipts, including the resale of vegetables purchased through the Wholesale Marketing Centre and monies received for services rendered to the public, amounted to £63,909 as shown at Appendix "A". If the receipts be deducted from the total expenditure the actual operating cost of the Department of Agriculture for 1959 was £129,169.

Appendix "C" shows the actual cost of the Wholesale Marketing Centre.

XI. ACKNOWLEDGEMENT

I would like to record my grateful appreciation to the Chairman and Members of the Board of Agriculture for their valuable help and guidance throughout the year.

To the members of the Staff of the Department of Agriculture I would like to express my sincere thanks for the efficient manner in which they executed their duties, at times, under somewhat difficult circumstances.

I also express my thanks to the members of the many organizations connected with agriculture and horticulture, all of whom assisted me in so many ways.

Respectfully submitted,

GORDON R. GROVES,
Director of Agriculture.

26th February, 1960.

APPENDIX "A"

Summary of receipts for year 1959

Vote	2	(a)	Marketing Centre	£52,580 0 6
	2	(b)	Service to citrus growers	4,398 16 4
	2	(c)	Reafforestation services	2,540 8 9
	2	(d)	Other receipts	4,390 12 10
				£63,909 18 5

APPENDIX "B"

Expenditure for period 1st January to 31st December, 1959

Vote	Service	Amount of Vote	Expenditure	Balance Lapsing
1	Fees to members of Board	£ 250 0 0	£ 156 0 0	£ 94 0 0
2 - 15	Salaries	19,934 0 0	16,127 17 8	3,806 2 4
6	Special Allowance to Horticulturist	312 0 0	– – –	312 0 0
9	" " to T. A. Hollis	400 0 0	150 0 0	250 0 0
16 - 17	Bonus on Salaries	3,712 0 0	3,395 0 8	316 19 4
18	General Grant	5,000 0 0	4,675 2 5	324 17 7
19	Control of Animal diseases and improvement of Livestock	1,500 0 0	1,484 9 11	15 10 1
20	Control of Plant Diseases and Pests	6,000 0 0	5,392 9 10	607 10 2
21	Horticulture	3,000 0 0	2,885 10 2	114 9 10
22	Government House Gardens	3,300 0 0	3,176 5 0	123 15 0
23	Departmental Contingencies, travelling expenses, etc.	400 0 0	391 15 9	8 4 3
24	Packing House supplies and marketing investigation	1,000 0 0	317 1 4	682 18 8
25	Cold Storage plant operation	5,000 0 0	4,815 15 11	184 4 1
26	Upkeep and operation of Agricultural equipment and motor vehicles	4,500 0 0	4,453 12 8	46 7 4
27	Purchase of agricultural and reafforestation machinery and equipment	7,070 0 0	7,056 1 5	13 18 7
28	Purchase and storage of agricultural supplies	600 0 0	415 10 11	184 9 1
29	Purchase and storage of potatoes and other agricultural produce for resale	70,000 0 0	64,957 9 6	5,042 10 6
30	Agricultural Exhibitions	3,000 0 0	3,000 0 0	– – –
31	Biological Control	5,000 0 0	3,771 14 1	1,228 5 11
32	Reafforestation and roadside planting and maintenance of public parks and gardens	60,000 0 0	58,398 9 9	1,601 10 3
33	Publications	400 0 0	399 3 6	16 6
34	Agricultural and horticultural extension work and agricultural education	750 0 0	699 15 6	50 4 6
35	Grants to Arbor Societies	200 0 0	200 0 0	– – –
36	Maintenance of school playing fields	4,500 0 0	4,500 0 0	– – –
37	Donation, Royal Botanical Garden, Kew	250 0 0	250 0 0	– – –
38	Purchase of motor vehicles	2,100 0 0	2,008 14 10	91 5 2
		£208,178 0 0	£193,078 0 10	£15,099 19 2

APPENDIX "C"

Statement of Expenditure and Receipts of Wholesale Marketing Centre

Expenditure

Salaries of Marketing Officer and Assistant	£ 2,060 0 0
Operation of Cold Storage Plant, labour, rent and electricity	4,815 0 0
Purchase of vegetables for resale	64,957 0 0
	£71,832 0 0

Receipts

Sale of vegetables in 1959	£52,580 0 0
Stock in hand, 31st December, 1959	132 0 0
Outstanding accounts 31st December, 1959	3,370 0 0
	£56,082 0 0

APPENDIX "D"

Summary of Land Usage

Vegetable Crops	666 acres
Fruit Crops	150 "
Flower Crops	42 "
Pasture Land	600 "
Fodder Crops	60 "
Bare fallow	22 "
	1,540 acres

APPENDIX "E"

Production of Ground Crops, Animal Products and Livestock Population

Vegetables	Area under crop expressed in acres	Average yield per acre in lbs.	Total yield in lbs.	Unit Value	Farm Value
Beans	30	4,000	120,000	1/6d	£ 9,000
Beets	10	8,000	80,000	7d	2,333
Broccoli	15	2,500	37,500	1/6d	2,872
Cabbage	45	10,000	450,000	7d	13,125
Carrots	50	12,000	600,000	8d	20,000
Onions	15	10,000	150,000	8d	5,000
Potatoes, Irish	256	8,000	2,048,000	6d	51,200
Potatoes, Sweet	45	8,000	360,000	6d	9,000
Tomatoes	40	9,000	360,000	1/4d	24,000
Miscellaneous	50	8,000	400,000	7d	11,606
Bananas	110	10,000	1,100,000	8d	31,665
	666		5,705,500		£179,801

Citrus

Area under cultivation in acres	No. of trees	Average yield per trees in dozens	Total yield in dozens	Unit Value	Farm Value
80	8,000	20	160,000	5/0	£40,000

Lily Bulbs and Flowers

Area under cultivation in acres	No. of bulbs planted	No of bulbs exported	No. of boxes of flowers exported	Value
13	520,000	Nil	3,920	£5,593

Animal Products

Milk

Total production expressed in gallons	Unit Value	Value
611,526	5/8	£173,215

Meat Products

Beef in lbs.	Value	Veal in lbs.	Value	Pork in lbs.	Value	Poultry in lbs.	Value
73,600	£5,795	14,500	£1,087	198,150	£19,815	80,000	£12,000

Eggs

Expressed in dozens	Unit Value	Value
485,000	5/-	£121,250

Dairy Animals

Cows	Heifers	Bulls	Total
1,048	190	48	1,287

Horses

Farm and Truck	Carriage	Saddle Horsss	Race Horses	Ponies	Total
80	38	20	25	20	183

Pigs

Sows	Boars	Store Pigs	Piglets	Total
320	50	1,079	1,620	3,069

Goats — 310